Graphing Nets to Find Perimeter, Surface Area & Volume

Objectives
- To identify and graph integers on the coordinate plane
- To learn to recognize a 2-dimensional pattern for a 3-dimensional solid
- To find the surface area of a rectangular prism
- To find the volume of a rectangular prism

Materials
- One activity sheet per student
- One coordinate plane per student (drawn on 1-cm square grid paper)
- Rulers
- Scissors
- Glue sticks
- 1 Crayon/colored pencil (optional)

Vocabulary
Coordinate plane: formed by two intersecting and perpendicular number lines, the x-axis and y-axis
Net: a 2-dimensional pattern that can be folded into a 3-dimensional prism or pyramid
Surface area: the sum of the areas of the faces of a solid figure
Volume: the amount of space a solid figure occupies; measured in cubic units

Activity
1. Distribute one activity sheet and one coordinate plane per student.
   - Make sure you label the coordinate plane before you make photocopies.
   - Label the coordinate plane vertically (the long axis y and the shorter axis x).
   - Note that each square is 1 cm by 1 cm; label the axes in integer intervals.
   - The x-axis should be labeled from –8 to 8.
   - The y-axis should be labeled from –12 to 12.

2. Use the activity to have students:
   a. Graph ordered pairs onto a coordinate plane
   b. Create their own nets for a rectangular prism
   c. Find the perimeter of their nets using a ruler, in centimeters
   d. Find the surface area of their nets, in cm²
   e. Find the volume of their nets, in cm³
Using Nets

1. Plot and label the following points on the coordinate plane provided.
   A (-5, 10)  B (5, 10)  C (5, 3)  D (5, 0)  E (8, 0)  F (8, -7)
   G (5, -7)  H (5, -10)  I (-5, -10)  J (-5, -7)  K (-8, -7)  L (-8, 0)
   M (-5, 0)  N (-5, 3)  P (-3, 12)  Q (3, 12)  R (8, 3)  S (8, -10)
   T (-8, -10)  U (-8, 3)

2. Connect the following points with **solid** line segments.
   A & B  B & C  C & D  D & E  E & F  F & G
   G & H  H & I  I & J  J & K  K & L  L & M
   M & N  N & A  N & C  M & D  M & J  D & G
   J & G

3. Lightly color/shade in your net. What solid do you think this net will form?

4. Use a ruler to find the perimeter, in cm, of the net you created.

5. What is the net’s surface area, in cm²? Explain how you found it.

6. Connect the following points with **dashed** line segments.
   A & P  P & Q  B & Q  D & R  E & R  F & S
   G & S  J & T  K & T  L & U  M & U

*These sections will be your glue tabs. Don’t color them in.

7. Neatly cut out your net along the outer solid and dashed edges.

8. Fold your net along the solid lines and place glue on the white glue tabs to create your 3-D figure.

9. What is the volume of your solid? What are the units?